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European Middle to Upper Paleolithic Transitional Industries: Châtelperronian

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State of Knowledge and Current Debates

About 45,000 years ago, anatomically modern humans migrated into Europe, and a few

thousand years later Neanderthal populations had completely vanished from Europe. This replacement of the local populations by anatomically modern humans also happened in the rest of Eurasia. It explains why today we are the only human species on the planet when Hominin groups flourished for several million years.

The Châtelperronian industry (*Châtelperronien* or *Castelperronien* in French) is considered to be the very last behavioral testimony of Neanderthals in France and northern Spain. For a few millennia, Neanderthals switched to systematic blade production, focused on stone knives that could also be used as projectile points, and in some instances produced domestic bone tools and used black and red pigments as well as personal ornaments.

What appears to be a brief episode, compared to other Late Pleistocene industries, is indeed often considered as a Neanderthal *"swan song."* Châtelperronian behaviors are actually part of a more global industrial change and evolutionary trajectory. This global industrial change would have been driven by the search for stone-tipped weapons, and possibly correlated with new organic and lithic material procurement strategies as well as a new social network organization (Bon 2010). The model of a clear-cut revolution with the arrival of modern Humans in Europe (Mellars & Stringer 1989) was put forward in the mid-1980s. At that time, it was grounded on available data on Neanderthal behavior, which were a compilation of Neanderthal behavior over the Middle and the Late Pleistocene. During the last decade, new data on Neanderthal behavior during the last glacial cycle (including Neanderthals right before the peopling of Europe by modern humans) nuanced this model. In fact, almost every behavior previously thought to be unique to anatomically modern humans was shared, at least occasionally, by Neanderthals; image production on durable support is still one major difference (d'Errico 2003; Soressi 2005; Peresani et al. 2011). The Châtelperronian no longer appears as an *"avatar of a dying middle Paleolithic but [indeed] as the first machinery of an Upper Paleolithic to become"* (Bon 2010: 139).

Because the Châtelperronian is in a stratigraphic position at the crossroads of the Middle and Upper Paleolithic, because it is of Upper Paleolithic type, and because only Neanderthal remains were discovered associated with it, the Châtelperronian is often called a "transitional industry." Even if Mousterian "souvenirs" had been actively searched within Châtelperronian industries, they are almost nonexistent (see below). It is indeed clear that the Châtelperronian is neither an intermediate between the Middle and the Upper Paleolithic nor a mix of Middle and Upper Paleolithic behaviors. On the contrary, it is a unique set of behaviors that shares commonalities with contemporaneous industries.

It is interesting to note that the use of contemporary ideological construction is sometimes pleaded for (e.g., Zilhão et al. 2008) to contest interpretative models of the Middle to Upper Paleolithic transition. This passion is also visible in popular science movies and journals, and certainly illustrates how much Paleolithic archaeology can be a popular topic grounded on an ongoing debate. This entry aims to summarize the current state of understanding on a highly debated topic: the nature and significance of the Châtelperronian.

The Recognition and the History of the Châtelperronian

The Châtelperronian was originally defined by H. Breuil after the lithic industry found at the cave of fairies ("la grotte des Fées") in Châtelperron, a small village in central France. This industry contained a specific blade and point with a back shaped with abrupt retouches, the back of the point type being curved. Breuil emphasized the similarities between the Châtelperronian and the Abri Audi type industry, later attributed to the Mousterian of Acheulean Tradition (MTA), especially the high frequency of backed blades and poorness of bone tools. For Breuil, the Châtelperronian as well as the Mousterian of Acheulean Tradition were the first stage of the Upper Paleolithic. At the time, the Upper Paleolithic was divided into "Lower Aurignacian" (MTA and Châtelperronian), "Middle Aurignacian" (the actual early

Aurignacian), and "Upper Aurignacian" (the actual Gravettian); these were all clustered within pre-Solutrean sites (Breuil 1909–1911).

Twenty-five years later, D. Peyrony put the emphasis on what he called the Perigordian complex (*Périgordien complex* in French). He suggested that the Châtelperronian and the Gravettian were part of the same phylum, as they shared an emphasis on backed pieces with abrupt retouches. The "Middle Aurignacian" would be indeed intrusive in southwestern France and would have developed there, while the Perigordian would have found refuge in remote places and would be indeed only exceptionally visible in the archaeological record (Peyrony 1936).

With the start of the second half of the twentieth century, Peyrony's theory and the Perigordian phylum started to be disputed, first by H. Delporte. From his excavation and study of Châtelperron and La Gravette, Delporte advocated that these industries are not genetically related and should be named Châtelperronian and Gravettian (Delporte 1954). D. Sonneville-Bordes argued that the second stage of the Perigordian complex, the "Périgordien II," results from mixing the Aurignacian with some intrusive backed pieces (Sonneville-Bordes 1955). However, Sonneville-Bordes as well as others (including F. Bordes and L. Pradel), were convinced of the evolutionary link between what they renamed the Lower Perigordian (equivalent of the former Perigordian I, i.e., the Châtelperronian) and the Upper Perigordian (actual Gravettian). They used the interstratification Châtelperronian and Aurignacian recognized in 1967 at Le Piage and Roc-de-Combe as evidence of contemporaneity of the two industries (see references to original publications in Bordes 2003). And, they indeed supported Peyrony's view that the Aurignacian episode was caused by the intrusion of a non-local group into the Perigordian territory.

The debate went on through the 1960s but lost some of its interest during the following two decades. It eventually shifted towards the independence between the Châtelperronian and Gravettian when the first radiometric dates showed that the two industries were separated by about 10,000 years (Mellars et al. 1987). The interstratification between the Châtelperronian and Aurignacian were also shown to be not of anthropic origin and related to geological disturbance (Bordes 2003). Finally, another attempt to support potential interstratification (Gravina et al. 2005), or at least evidence for contemporaneity between the Aurignacian and Châtelperronian, was recently put forward but seems to suffer from insufficient demonstration (see Zilhão et al. 2008).

In fact, the major change of perspective on the Châtelperronian came at the end of the 1970s and was caused by the unexpected discovery of Neanderthal remains, and noticeably an almost complete skeleton, in a Châtelperronian context (Lévêque & Vandermeersch 1980). The Gravettian, Aurignacian, and Châtelperronian were not only technically different industries but were also generated by two biologically different human populations. The equation between the Middle Paleolithic type industry and Neanderthals, or Upper Paleolithic type industry and anatomically modern humans, then started to be questioned in Europe, as it had already been questioned in the Near East.

The Makers of the Châtelperronian

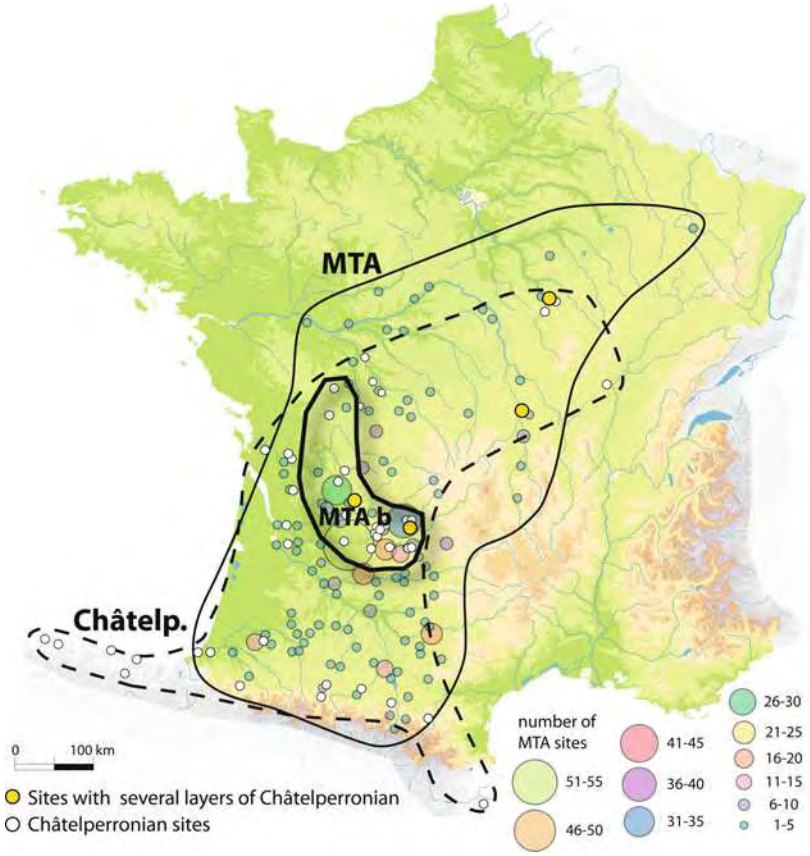
Châtelperronian human remains (some of which are illustrated in Fig. 1) are overwhelmingly more abundant than human remains found in the late Mousterian or in early phases of the Aurignacian. There are 29 isolated teeth, one temporal bone, and other fragmentary remains in the Châtelperronian from Grotte du Renne at Arcy-sur-Cure. All the teeth but one were assigned to the reference Neanderthal group with posterior probabilities ranging from 59 % to 99.9 % (Bailey & Hublin 2006). The morphology of the Grotte du Renne inner ear preserved in the temporal bone is typical of Neanderthal morphology (Hublin et al. 1996). Châtelperronian human remains also include one nearly complete skeleton and some extra isolated teeth found at Saint-Césaire (Lévêque & Vandermeersch 1980). Taxonomic attribution for the Saint-Césaire skeleton has been confirmed by several authors, and the Saint-Césaire isolated teeth also display

European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 1 Châtelperronian human remains from Grotte du Renne at Arcy-sur-cure (**a**: teeth and **b**: temporal bone), and from Saint-Césaire (**c**: in-situ skeleton and **d**: close up of the skull of the skeleton after reconstruction) (After Bailey & Hublin 2006; Hublin et al. 1996; photo of the cast of the in-situ skeleton © Soressi)

a Neanderthal morphological pattern (Bailey & Hublin 2006). By comparison, the number and quality of human remains attributed to the Protoaurignacian are much lower, only some fetal remains and one deciduous tooth, and none of them are diagnostic (Hublin in press).

Nevertheless, the view that the Châtelperronian was made by Neanderthals was recently challenged, primarily by questioning the stratigraphic integrity of key sites, rather than discovering new human remains that would have directly challenged the Neanderthal signal for the Châtelperronian. It was suggested that Neanderthal remains found at the Grotte du Renne result from contamination from underlying Mousterian layers. This conclusion was reached thanks to the analysis of a series of ^{14}C AMS dates that were inconsistently variable in the Châtelperronian layer (Higham et al. 2010). However, 31 new ^{14}C measurements falsify the notion that large-scale movements of archeological material occurred between the Mousterian, Châtelperronian, and Proto-Aurignacian layers at the Grotte-du-Renne and questioned the sampling methodology in the first study (Hublin et al. 2012; see details below in the chronology section). Reworking of the Neanderthal remains from the underlying Mousterian layers is inconsistent with the fact that these Mousterian layers contained very few human remains, and last but not least Neanderthal remains were found throughout the four Châtelperronian layers at Grotte du Renne, not only the lowermost one (Hublin et al. 2012).

The Neanderthal nature of the makers of the Châtelperronian was also indirectly challenged by criticizing the local origin of the Châtelperronian. If the origin of the Châtelperronian is not within the local Mousterian of Acheulean Tradition type B, as put forward first by H. Breuil (1909-11), it opens the door for a non-Neanderthal origin. This hypothesis is also intriguing inasmuch as anatomically modern human remains had been recently published in another so-called "transitional" industry: the Uluzzian from Italy (Benazzi et al. 2011).



European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 2 Map of the distribution of the Mousterian of Acheulean Tradition (MTA; *bolded line*), the Mousterian of Acheulean Tradition type b (*shaded line*) and the Châtelperronian (*dotted line*)

Yet, arguments for a local Mousterian of Acheulean Tradition origin for the Châtelperronian are as follows:

1. The Mousterian of Acheulean Tradition and the Châtelperronian share a unique interest for backing tools and for unretouched backed blanks,
2. They also share a unique combination of elongated and backed blanks or retouched tools, which does not exist in any other contemporaneous industry,
3. The necessity to obtain backed artifacts (retouched and unretouched) is actually guiding the production of Mousterian of Acheulean Tradition elongated flakes (Pelegrin & Soressi 2007; Soressi 2005) as well as the production of Châtelperronian blades (Roussel 2011 & in press). Backed elongated flakes and backed blades (i.e. with an asymmetrical transversal section) are obtained directly during the production. The method used to produce blanks within the two industries is relying on the obtainment of a high quantity of backed blanks, some of which will be retouched. Some extra backed artifacts, retouched backed knifes and châtelperron points, are obtained through a-posteriori retouch of blanks symmetric in section.
4. Geographic distribution of the Châtelperronian matches outstandingly that of the Mousterian of Acheulean Tradition (Fig. 2), and they are chronologically compatible (Soressi 2005).

European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 3 Map of Châtelperronian sites (sites with several layers of Châtelperronian are indicated in *yellow*) (modified from Pelegrin & Soressi 2007 and from Roussel 2011)

Geographic Distribution

The Châtelperronian point or knife is quite distinctive from other Paleolithic retouched artifacts and allows for a quite easy diagnosis of Châtelperronian sites (Pelegrin & Soressi 2007). The map of Châtelperronian sites is indeed reliable. In contrast to other industries of the Middle or Upper Paleolithic, the geographic distribution of Châtelperronian sites is relatively small (Fig. 3). A little more than 40 sites have been recognized on an arch about 300 km wide, which fits closely the west half of the Massif Central. They are found from Burgundy, with the famous site Grotte du Renne at Arcy-sur-Cure, extending through the Dordogne Valley, down to Cantabria, with Cueva Morin,

and the Oriental Pyrenees with Le Portel (Fig. 3). No Châtelperronian sites were found in the Rhone valley, in southeastern France, or in northeastern France, in the heart of the Parisian basin or in Brittany.

Dating

The Châtelperronian is always interstratified between Mousterian and Aurignacian layers (see details about putative stratification Châtelperronian/Aurignacian/Châtelperronian above). If this stratigraphic position is clear, precise dating of the Châtelperronian with radiometric methods is nonetheless difficult. The ^{14}C method is at the edge of its time range, and the radiocarbon community agreed only recently on a calibration curve for the time range covered by the Châtelperronian. Specific methods were recently developed to cope with the very low percentage of carbon 14 contained in such old samples as well as with contamination issues (Higham et al. 2010; Hublin et al. 2012).

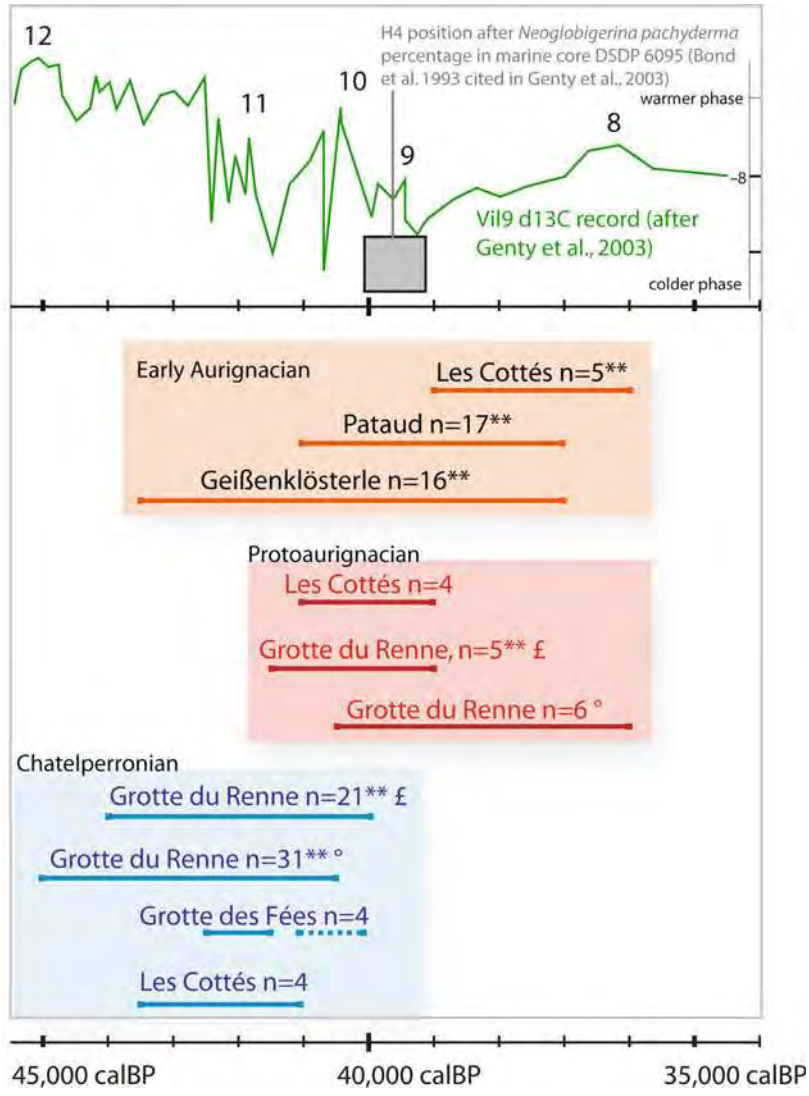
How to properly date Châtelperronian samples is intensely debated, as illustrated by a series of papers published on the Grotte du Renne deposits. First, 31 accelerator mass spectrometry (AMS) ultrafiltrated dates on bones, antlers, bone artifacts, and teeth indicated that the Châtelperronian from Grotte du Renne was 44 to 40,000 years old (cal. BP). The high degree of intralayer variation in the radiometric dates obtained was used by the authors to support admixture between the Châtelperronian, Mousterian, and Protoaurignacian (Higham et al. 2010). It is interesting to note that this latter conclusion was put forward assuming that enough progress has been made within ^{14}C dating to make it totally reliable and to become a piece of data supporting site integrity on its own. This former conclusion was first contested and discussed in a series of papers that showed that there were several arguments grounded on the study of the archaeological material to show that there was no major mixing between layers at the Grotte du Renne. Also, 35 new measurements were recently performed with a different sampling strategy aiming at the acquisition of well-preserved collagen, by selecting bigger and thicker samples of cortical bone (Hublin et al. 2012). These have shown that:

1. younger ages obtained by the first study were certainly related to a low collagen content
2. no mixing could be deduced from new AMS ^{14}C measurements done on bone with high percentage of collagen content,
3. the age of the Châtelperronian at the site fits between 45,000 and 40,500 years cal. BP with a 2 sigma range. This fits with other ages obtained at other sites with the same method (Fig. 4).

Characteristics of the Châtelperronian Lithic Industry

The first extensive study of Châtelperronian lithic industries was done by F. Harrold (1978), who studied 19 Châtelperronian assemblages from France and northern Spain (after having reviewed more than 100 potential Châtelperronian assemblages). Using Sonneville-Bordes and Perrot stone-tool type lists, Harrold highlighted the recurrent features of the Châtelperronian. He showed that the Châtelperron points/knives are typical of the Châtelperronian, and they count for up to 60 % of the typological count. Châtelperron points or knives go with end-scrapers and burins. The typological spectra of these Châtelperronian assemblages allowed Harrold to conclude that the Châtelperronian is a *"distinct lithic tradition of the earliest Upper Palaeolithic"* (Harrold 1978: 435).

A new approach to the Châtelperronian lithic industry was brought in by J. Pelegrin in the mid-1980s (Pelegrin 1995). From his analysis of cores, stone-tools, and by- and end-products found at two Châtelperronian sites in southwestern France (Roc-de-Combe and La Côte), he provided the first description of the Châtelperronian "*chaîne opératoire*." For a long time, his study was in fact one of the rare detailed *chaîne opératoire* analyses available for the Late Pleistocene. Pelegrin showed that Châtelperronian cores are aimed toward the production of rectilinear blades, and that they are organized with a narrow and wide surface, the narrow surface being a maintenance surface. Blades obtained on the wide surface and with



European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 4 Two sigma intervals for ages obtained using AMS and ultrafiltrated ^{14}C samples and calculated using a Bayesian model of Châtelperronian and other western European contemporaneous Early Upper Paleolithic industries. Les Cottés: see Talamo et al. 2012; Grotte de Fées: see Gravina et al. 2005; Grotte du Renne: see Higham et al. 2010; Hublin et al. 2012; Pataud: see Higham et al. 2011 cited in Higham et al. 2012; Geißenklösterle: see Higham et al. 2012. The number of samples is indicated. ** indicates that more than one level was studied. D13C record from the Villars stalagmite indicates a probable warm short event as recorded on the continent in the north of the Aquitaine basin (see Genty et al. 2003). The position of the Heinrich event 4 is also indicated after Bond et al. 1993, cited in Genty et al. 2003

regular edges are selected to be retouched into Châtelperron knives or points. Larger and thicker blades are retouched into end-scrapers, burins, or retouched blades. End-scrapers are also made out of flakes produced during the shaping of the core. From a detailed analysis of blade platforms, Pelegrin argued for the use of a soft hammer or a soft stone hammer during Châtelperronian blade production (Pelegrin 1995: 252). Scarce bladelet production was observed in both sites, but without any evidence of retouched bladelets.

Pelegrin argued that Châtelperronian lithic production is specific and shows strong differences from that of the Early Aurignacian. He indeed concluded that differences between Châtelperronian and early Aurignacian debitage did not support the hypothesis of an acculturation of the last Neanderthals by the first anatomically modern Humans (d'Errico et al. 1998). However, Pelegrin actually brought new data supporting a link between the Mousterian of Acheulean Tradition type B and the Châtelperronian. From his analysis of two MTA B assemblages, he showed that the MTA B and the Châtelperronian shared an emphasis on backed pieces made on elongated flakes or blades. This was later one

confirmed by extensive analysis of several other MTA B assemblages (Soressi 2005). Pelegrin main point was that this peculiar retouched tool should be linked to a specific kind of hafting, and indeed reflects a similar technical answer to comparable needs (Pelegrin 1995; Pelegrin & Soressi 2007).

Building on Pelegrin's pioneering work, a detailed analysis of the Grotte du Renne at Arcy-sur-Cure began. The totality of this abundant collection was studied by N. Connet (2002). She refined the understanding of variations through time and showed an increasing use of flint relative to other raw materials, coupled with an increasing use of blades. Backed pieces are more elongated and less curved toward the top of the sequence. Connet (2002) also insisted on the fully "Upper Palaeolithic character" of the Châtelperronian from the Grotte du Renne. There is no elaborated flake production at Grotte du Renne, as already seen in other Châtelperronian assemblages by Pelegrin (1995), and recently confirmed by Roussel (2011) and Bachellerie (2011).

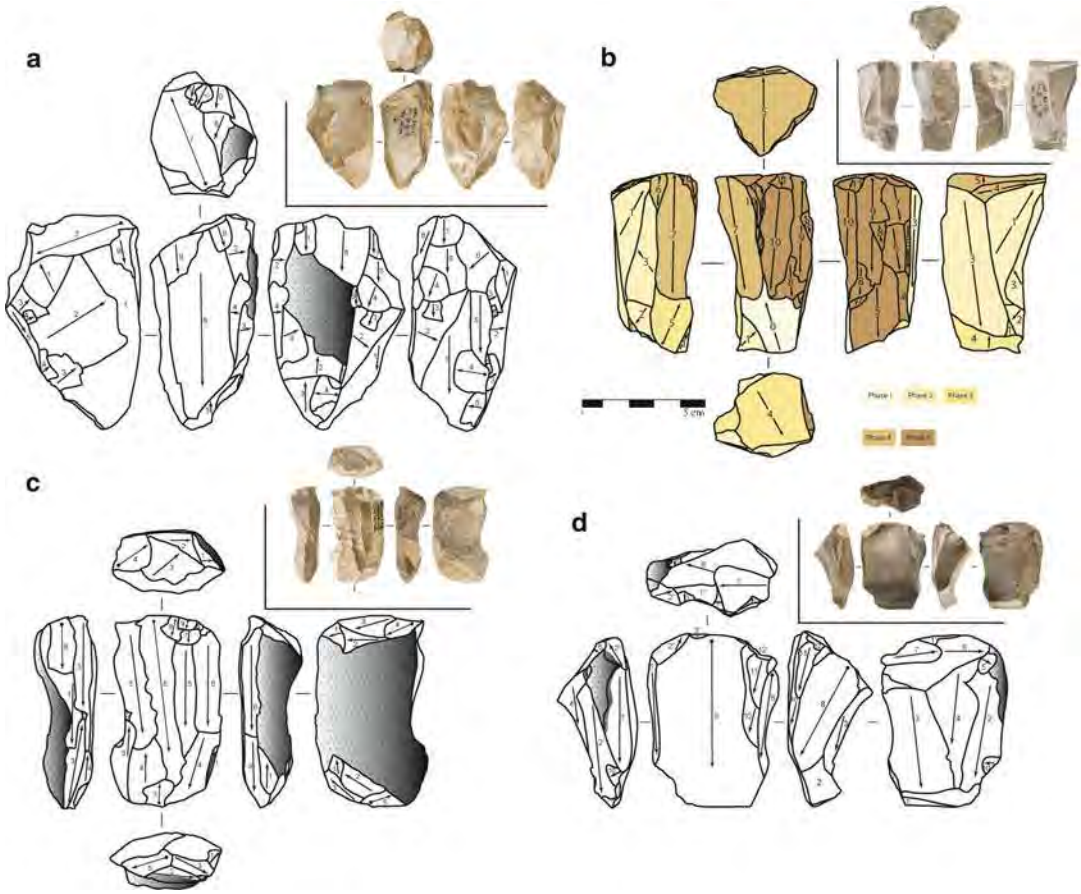
The first use-wear analysis of Châtelperronian points/knives from Grotte du Renne showed that they were used as knives and also certainly as projectile tips (Plisson & Schmider 1990).

A more refined description of Châtelperronian blade production, as well as a precise first description of the bladelet production, was recently done from first-hand analysis of three Châtelperronian layers from Quinçay (Roussel & Soressi 2010; Roussel 2011). At Quinçay, the Châtelperronian sequence is sealed by a large roof fall and there is no other Upper Paleolithic layer documented in stratigraphy: contamination from more recent Upper Paleolithic industry is indeed improbable. The recent technological analysis showed that blades are removed by independent series on narrow and on wide surfaces of the core (Roussel in press). Each surface of a blade core is an independent flaking surface (Fig. 5). Blade cores show mainly a triangular section. Blades symmetrical in section as well as blades asymmetrical in section are produced. The latter are obtained at the intersection of two angular surfaces (Fig. 6). Châtelperronian blade production is qualified as a *"two step rhythm on an angular flaking surface."* Blades with strong metrical norm, noticeably minimum thickness and minimum width, as well as technical norm are selected for Châtelperron points/knives. The size of Châtelperronian points ranges between fixed minimum and maximum dimensions. This norm is constant throughout the sequence at Quinçay (Roussel & Soressi 2010; Roussel 2011) and appears to be similar to the one in southwestern France (Bachellerie 2011: 351-354). Quinçay analysis also suggests that semi-circular end-scrapers retouched on large cleaning flakes removed at the end of the blade production on blade core might be another type fossil for the Châtelperronian (Fig. 7: o and p). The blank seems to be specific to Châtelperronian blade production, as well as to the location of the retouch (Roussel 2011, in press).

Bladelet production is documented in the three Châtelperronian layers from Quinçay and follows a method similar to the one used for the blade production. However, bladelet cores are not reduced blade cores. Bladelet production is independent from blade production, and is done on already small blocks. Bladelets are long and slightly curved and are mainly retouched with marginal and inverse retouches on one edge only (Roussel 2011). Bladelet production would also be documented in southwestern France, but the rarity of retouched bladelets as well as potential biases in assemblages excavated before the systematization of fine screening make it difficult to interpret (Bachellerie 2011: 367-368). Comparison with the Protoaurignacian production allows the suggestion of stimulus diffusion between Protoaurignacian and Châtelperronian groups (Roussel 2011; and see below).

Personal Ornaments, Bone-Tools, and Pigments in the Châtelperronian

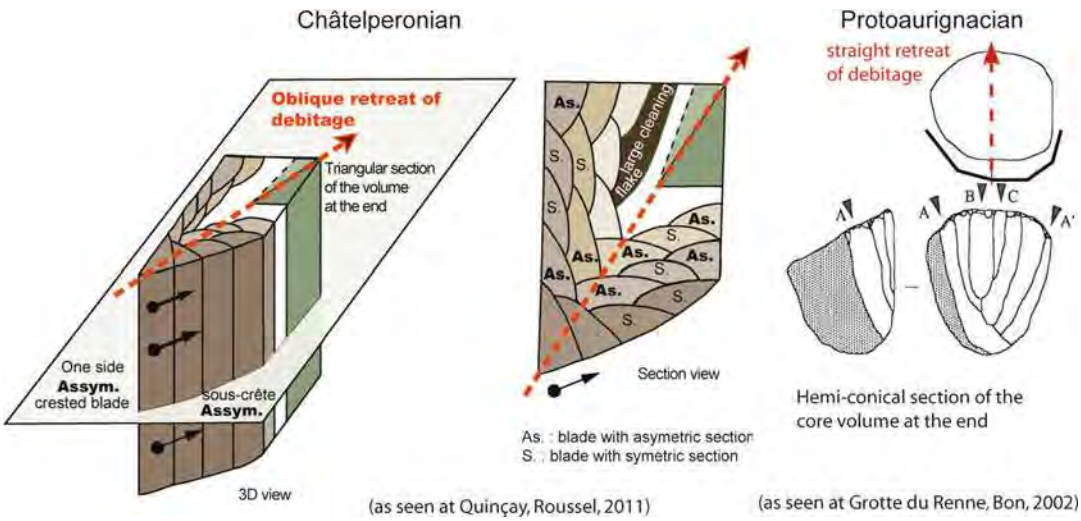
Personal ornaments and bone-tools are rare within the Châtelperronian, but one site, Grotte du Renne, revealed a significant collection (Hublin et al. 1996; d'Errico et al. 1998, 2001; Carron et al. 2011; Fig. 8). About 40 personal ornaments were found at Grotte du Renne, and 6 pierced teeth were also found at Quinçay



European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 5 Châtelperronian blade cores from Quinçay (After Roussel in press) abandoned at different stages. (**a**) Initialized core with a dissymmetrical volume, (**b**) Core exploited on two surfaces with a triangular section, (**c**) Core exploited on the wider surface with a testimony of a previously exploited narrow surface, on the right, (**d**) Core with a large cleaning flake on the wider surface

(Granger & Lévêque 1997). Some of the bone-tools from Grotte du Renne are decorated. At first, they were interpreted as resulting from exchange with Aurignacian groups because they show some similarities with personal ornaments discovered in the above Protoaurignacian layer (Hublin et al. 1996). Later, it was shown that bone tools manufacturing waste are present at the site during the Châtelperronian, which does not support the exchange hypothesis for the bone-tools (d'Errico et al. 2001). It was also shown that the highest number of bone-tools is found in the lower and richest Châtelperronian layer at the Grotte du Renne, and that they are found in areas that do not correspond to areas where the Aurignacian bone-tools are found in overlying deposits. Contamination from the above Aurignacian layers is indeed unlikely (d'Errico et al. 2001; Caron et al. 2011). Study of perforation techniques has shown that pressure or percussion techniques after thinning by scraping were preferentially used at Quinçay (Granger & Lévêque 1997). Meanwhile, percussion techniques seem more variable at Grotte du Renne and are similar to the perforation techniques used during the Aurignacian (White 2001).

More than 20 kg of pigment, as well as pigment grinding tools, have been discovered at



European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 6 Schematization of blade production in the Châtelperronian and in the Protoaurignacian (After Roussel in press)

Grotte du Renne. Black and red pigments had been used (without heating), mostly as coarse powder to cover large surface areas, soils, or hides, and also as fine and highly coloring powder (Salomon 2009).

Contacts with Contemporaneous Groups

The existence of contacts between Châtelperronian and Aurignacian groups was intensely debated during the late 1990s. The lithic industry was quickly identified as being clearly different from the Aurignacian (Pelegrin 1995; d'Errico et al. 1998). Nonetheless, the fact that bone-tools and personal ornaments were not intrusive (d'Errico et al. 1998; Carron et al. 2011) seemed irreconcilable with the fact that some of them looked like the Aurignacian specimens and used techniques similar to the Aurignacian techniques (White 2001). Also, the development of these behaviors in indigenous groups when Aurignacian groups were entering Europe appeared to be an *"impossible coincidence"* (Mellars 2005).

The recent analysis of Quinçay bladelet production as well as a precise comparison of the blade production within the Protoaurignacian shed new light on the question of contacts. The method, as well as the goals, of the Châtelperronian blade production is clearly different from that of the Protoaurignacian. For the Protoaurignacian, the core volume is symmetric instead of being asymmetric in section, the flaking surface is large and integrates edges of the core, and the blade production is continuous all over the surface and is divided in series on each side of the core. The production rhythm is continuous on a large and curved surface and is in essence very different from the *"two step rhythm on an angular flaking surface."* Moreover, the Protoaurignacian blades do not show any asymmetrical section, and they are removed from a platform that is more oblique relatively to the debitage surface than the Châtelperronian one (Roussel 2011, in press). Bladelets are obtained following a method similar to the one used for blades in both industries; they are indeed different in the Châtelperronian and in the Protoaurignacian. However, the goal is similar: obtaining bladelets with marginal and inverse retouches on one edge, i.e., Dufour sub-type Dufour bladelets (Roussel 2011).

According to the theoretical model put forward by G. Tostevin (2007), sharing a common goal and using a different method of production can be interpreted as a testimony of the effects of stimulus diffusion. Stimulus diffusion implies that ideas are diffused inside a territory of one group from an adjacent one. These ideas are reinterpreted by the borrower group, depending

European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 7 **a** to **l**: Châtelperronian knives/points; **m**: Audi type knife; **n** to **r**: semi-circular end-scrapers, including two (**o** and **p**) which were manufactured on a large cleaning flake extracted at the end of the blade production, and which might be another type fossil of the Châtelperronian. All artifacts are from Quinçay (After Roussel & Soressi 2010)

European Middle to Upper Paleolithic Transitional Industries: Châtelperronian, Fig. 8 Châtelperonian personal ornaments, bone-tools and pigments from La Grotte du Renne at Arcy-sur-Cure (Reproduced after Carron et al. 2011)

on the contact type between the two groups, and noticeably depending on the level of social intimacy. Episodic contacts at places with a low degree of social intimacy, like along the pathways, are opposite to intimate contact at residential sites where not only the end-product can be observed but also the process of manufacturing it can be observed, learned, and reproduced. Depending on the degree of social intimacy and social organization of each group, the results of contact would vary from conservatism up to total integration of procedures (Tostevin 2007). Given the geography and the age of the Châtelperronian and of the Protoaurignacian (see above), given the similarity between Protoaurignacian retouched bladelets that could have been lost during the hunt along pathways, and given the fact that they were produced using different processes, it is indeed probable that the idea of Dufour bladelets diffused from one group to the other. This could have been the case on pathways, for instance, and would then imply a low degree of social intimacy between the two groups (Roussel 2011). The nature and style of personal ornaments could also be explained by a similar process.

Conclusions

The Châtelperronian is an early Upper Paleolithic industry with blade and bladelet production, personal ornaments and bone-tool production and use, and without any formal flake production. The debate around it fundamentally changed when an almost complete Neanderthal skeleton was discovered and associated with it at Saint-Césaire, confirming the earliest discoveries of Neanderthal remains made at Grotte du Renne. From then on, what was initially considered as a fully Upper Paleolithic industry started to be called a "transitional industry" in order to reconcile the archaic biology of the authors and the advanced nature of the industry. Nonetheless, except at some exceptional sites, the Châtelperronian is a well-defined and fully Upper Paleolithic industry that is neither a mix nor an intermediary between industries, as suggested by the unfortunate term

"transitional." It is only transitional because it is in stratigraphic sequences after the Mousterian and before any other Upper Paleolithic industry.

The Châtelperronian is always replaced by the Aurignacian: the stratigraphic position of the Châtelperronian suggests a global shift. Still, this does not preclude contemporaneity and long-distance contact between the Neanderthal makers of the Châtelperronian and other groups, especially with anatomically modern humans using Protoaurignacian technology. The diffusion of the idea of Dufour bladelets from one group to the other, in the absence of diffusion of the process used to manufacture them, would imply a low degree of social intimacy and only episodic contacts on non-residential sites.

Cross-References

- ▶ European Middle to Upper Paleolithic Transitional Industries: A Socioeconomic Approach
- ▶ *Homo neanderthalensis*
- ▶ Neanderthals and Their Contemporaries

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